

CLAIMS

What is claimed is:

1. A method for producing encapsulated particles to be added to food products, said method comprising:

forcing a first liquid through a first exit opening in an electrified first feeding needle to form a Taylor cone at the first exit whereby an extremely thin jet of the first liquid is emitted into a chamber;

forcing a second liquid, non-miscible with the first liquid, through a second exit in a second feeding needle, wherein the second feed needle is concentrically located with respect to the first feeding needle, in a manner which causes the second liquid to form a conical meniscus which is anchored at the second exit of the second feeding needle and surrounds the Taylor cone of the first liquid;

wherein a jet of the second liquid, which is coaxial with, and surrounds, the extremely thin jet of the first liquid, is issued from the conical meniscus into the chamber;

wherein the second feeding needle can be at the same or different electrical potential than the first feeding needle;

wherein the chamber contains a dielectric atmosphere;

wherein stable fluid interfaces are maintained between the second liquid and the gas or vacuum in the chamber and wherein the second and first liquids forced from the first and second feeding needles form, when the coaxial jets break apart, the encapsulated particles; and

wherein the encapsulated particles comprise an inner core of the first liquid and an outer layer of the second liquid and wherein the encapsulated particles have an average diameter of about 100 microns to about 15 nanometers.

2. The method of claim 1, wherein the second liquid forms a Taylor cone and first liquid is driven by the second liquid.
3. The method of claim 1, wherein the first liquid is a food or food additive and the second liquid is a polymer material which encapsulates the food or food additive when the coaxial jets break down.
4. The method of claim 2, wherein the first liquid is a food or food additive and the second liquid is a polymer material which encapsulates the food or food additive when the coaxial jets break down.
5. The method of claim 1, wherein the first liquid is a food or food additive with high nutritional value but offensive taste and the second liquid is a polymer which encapsulates the food or food additive when the coaxial jets break down.
6. The method of claim 2, wherein the first liquid is a food or food additive with high nutritional value but offensive taste and the second liquid is a polymer which encapsulates the food or food additive when the coaxial jets break down.
7. An improved or functional food product comprising a food product and an effective amount of one or more enhancing additives, wherein the one or more enhancing additives are incorporated into the food product in the form of encapsulated particles comprising an inner core containing the one or more additives and a protecting composition as an outer layer surrounding the inner core, and wherein the encapsulated particles have an average diameter of about 100 microns to about 15 nanometers, whereby the protecting composition prevent or significantly reduces any adverse effects of

the one or more additives on the organoleptic or other properties of the improved or functional food product.

8. The improved or functional food product of claim 7, wherein the encapsulated particles are prepared using a method comprising:

forcing a first liquid through a first exit opening in an electrified first feeding needle to form a Taylor cone at the first exit whereby an extremely thin jet is emitted into a chamber;

forcing a second liquid, non-miscible with the first liquid, through a second exit in a second feeding needle, wherein the second feed needle is concentrically located with respect to the first feeding needle, in a manner which causes the second liquid to form a conical meniscus which is anchored at the second exit of the second feeding needle and surrounds the Taylor cone of the first liquid;

wherein a jet of the second liquid, which is coaxial with, and surrounds, the extremely thin jet of the first liquid, is issued from the conical meniscus into the chamber;

wherein the second feeding needle can be at the same or different electrical potential than the first feeding needle;

wherein the chamber contains a dielectric atmosphere;

wherein stable fluid interfaces are maintained between the second liquid and the dielectric atmosphere in the chamber and wherein the second and first liquids forced from the first and second feeding needles form, when the coaxial jets break apart, the encapsulated particles; and

wherein the first liquid is the one or more enhancing additives and the second liquid is the protecting composition.

9. The improved or functional food product of claim 7, wherein the one or more enhancing additives are selected from the group consisting of vitamins, minerals, colorants, herbals, nutraceuticals, flavonoids,

antimicrobials, preservatives, dietary supplements, fiber, phyto-chemicals, omega acids, carotenoids, and collagen.

10. The improved or functional food product of claim 8, wherein the one or more enhancing additives are selected from the group consisting of vitamins, minerals, colorants, herbals, nutraceuticals, flavonoids, antimicrobials, preservatives, dietary supplements, fiber, phyto-chemicals, omega acids, carotenoids, and collagen.

11. The improved or functional food product of claim 8, wherein the one or more enhancing additives are biologically active ingredients which contribute to overall well being or reduce the risk of specific diseases or conditions in an animal consuming the improved or functional food product.

12. The improved or functional food product of claim 9, wherein the one or more enhancing additives are biologically active ingredients which contribute to overall well being or reduce the risk of specific diseases or conditions in an animal consuming the improved or functional food product.

13. The improved or functional food product of claim 11, wherein the animal is a human.

14. The improved or functional food product of claim 12, wherein the animal is a human.